ADSC/WSDOT Team Members

December 8, 2005

Members In Attendance

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The meeting began at 8:30 AM. Also attending this meeting was Gianfranco Diliceo from GD Consulting and Ron Lewis and Matt Rochon from WSDOT Bridge and Structures.

1. Review of Previous Meeting Minutes

Don Morin asked for clarification on the cost responsibility for failed anchors. Alan Macnab and Mo Sheikhizadeh clarified that failed soil nails are the responsibility of the State and failed ground anchors are the responsibility of the Contractor.

The meeting minutes were accepted without further comment.

Action Plan:

- No action needed.

2. Constructability Review

Matt Rochon and Ron Lewis from Bridge and Structures requested a constructability review of a soldier pile wall that is being planned near the UW Campus in Bothell. The new wall is located on a tight radius curve and is a maximum of eighty feet in height. The soils are generally glacial till, and the presence of groundwater is expected.

The preliminary proposal is to install a tiered wall for architectural reasons to help break up the face of the wall. Several ADSC Members expressed concern about the cost and complexity of constructing the tier. One suggestion was to construct a soldier pile wall without a tier and then use a fascia in front of the fall to produce the same architectural effect.

It was brought up that a soldier pile wall would be somewhat challenging because of the size of the piles that would be needed. The ADSC Members asked if a soil nail wall had been considered. Bridge and Geotech responded that they were concerned about constructing a soil nail with the presence of groundwater. Also, the toe of the wall is 45 feet deep. ADSC questioned why the toe needed to be so deep. Jim believed that the toe depth was needed to provide overall stability. He agreed to verify that this depth was necessary.

Alan Macnab suggested putting together a small group to provide a more detailed review. Bridge didn't believe there was adequate time to perform this review while meeting submittal deadlines.

Action Plan:

- Alan to assemble comments from ADSC members. Comments will be sent to Mo within one week.

3. Action Item Update

A. PGA Alternate Side Pocket Design

Mark Etheridge obtained price quotes to fabricate both the center pocket connection and the WSDOT side pocket detail. The WSDOT side pocket is about $150 more expensive than the center pocket. Mark pointed out a number of ways to make the side pocket connection more economical. He presented an alternate detail to WSDOT for consideration. The alternate detail is about $200 less expensive than the center pocket connection. This cost doesn't include the strapping between the piles that has been shown on past projects using the WSDOT side pocket design. When a cast-in-place fascia is used, Mark didn't see the need for strapping.

Mo agreed to have Bridge and Structures review the alternate side pocket design proposed by Mark.

Action Plan:

- Mo to provide alternate side pocket design to WSDOT Bridge and Structures for their review.

B. Soldier Pile Concrete Mixes

Previously, the State agreed that it is acceptable to use CDF with soldier piles that use Permanent Ground Anchors (PGA's). For cantilever soldier piles, CDF is also acceptable. However, for both wall types, CDF is only acceptable when concrete is being placed in the dry. If concrete is being placed in the wet, a pumpable lean mix concrete will be required.

WSDOT is currently looking at ways to specify the lean mix concrete. The preference is to specify a required compressive strength that needs to be met prior to backfilling behind the wall or excavating in front of the wall. Several ADSC members expressed concern about requiring compressive strength testing. They were concerned that the strength and set-up in a cylinder mold will be much different than the strength and set-up when placed in a pile hole. Jim Cuthbertson suggested visual inspection in the field. The Inspector would insure that the lean-mix is solid, non-flowable, and needs to be removed by mechanical means prior to allowing backfill or excavation. The ADSC Members were generally in favor of this type of performance criteria.

As a side note, the question was raised about whether WSDOT considers loading from construction equipment at the top of the wall during construction. Jim Cuthbertson responded that live load surcharge is only considered when there are actual live load traffic lanes at the top of the wall in the final configuration. He acknowledged that this may be an area for improvement.

WSDOT will continue work on developing specifications for lean-mix concrete.

Action Plan:

- Mo will continue to develop specifications for lean mix concrete.
- Jim to evaluate if construction equipment live load surcharge should be applied to future soldier pile wall designs.

C. Noise Wall/Sign Bridge Shaft Prequalification

Jim Spaid will be presenting the proposed prequalification criteria to AGC this week. Preliminarily, the State believes that the AGC will not disagree with this proposed specification. Jim intends to use a prequalification specification similar to that which is already used for bridge shafts.

Action Plan:

- Mo to provide another update at next meeting.

D. Shaft Installation Submittal changes

Mike Bauer discussed changes that have been made to the drilled shaft submittal to simplify the process for the Contractor. Two items have been deleted from the submittal and three items have been modified so they can be submitted and reviewed on an annual basis. If the Contractor wishes to pursue annual review, the items shall be submitted to HQ Construction.

There was discussion about including an additional item in the submittal. Currently, the Contractor is not required to demonstrate how the column cage will be held in position during construction. The team agreed to re-incorporate Submittal Item 8 for the Contractor to provide details of how the cage will be held in place.

Action Plan:

- Mike Bauer to re-incorporate Item 8 into the submittal as described above and in 7 and 8 below.

New Business

4. Top of Shaft Cleanliness in Deep Transition Zones

Mark Gaines provided a handout to the team showing the current details for drilled shafts constructed in both low and high water tables. After discussion and review, the team members agreed that the present details are acceptable. ADSC again reiterated that the construction joint between the drilled shaft and column should be located as high as possible. Mo agreed to send a memo to Bridge and Structures encouraging them to locate construction joints preferably above the water table, but has high as possible if below the water table.

Action Plan:

- Mo to send memo to Bridge and Structures.

5. Adverse Effects of Shaft Construction Time on Capacity

Previously, the Team has discussed the potential issue of soil relaxation that reduces skin friction capacity when a shaft is opened up for an extended time. Alan Macnab and John Tuttle have investigated a report that may have been written on this topic. Alan now believes that this issue was raised by Dr. David Crapps . Apparently, Dr. Crapps has done some research and put together a Power Point presentation on the topic, but has not written a formal paper.

Alan believes that this research may be based on shafts that were constructed using mineral slurry. He thought that perhaps the decrease in skin friction was related to the effects of mineral slurry on the sides of the shaft rather than soil relaxation.

Action Plan:

- WSDOT to discuss internally. No other action required at this time.

6. Effects of Bentonite Slurry on Shaft Axial Capacity

This topic has been discussed at previous meetings. WSDOT is concerned that the use of Bentonite slurry will reduce the shaft skin friction below values assumed by the Engineer. Alan Macnab was able to discuss this with Dan Brown. Dan advised that there is no adverse effect when Bentonite is used in silts and clays, but skin friction may be reduced by a factor of two when Bentonite is used in fine sandy soils. However, Dan told Alan that we don't need to be concerned with this issue. WSDOT uses the FHWA drilled shaft design parameters when designing drilled shafts. Dan informed Alan that these parameters were calibrated using drilled shafts constructed with Bentonite slurry. The factors used by WSDOT are acceptable for Bentonite slurry and conservative for synthetic slurry in fine sandy soils.

Mo informed the Team that Bentonite slurry has already been removed from the Special Provisions. However, Mo agreed that the State should re-evaluate this decision in light of this new information.

Action Plan:

- Mo to work with Geotech to re-evaluate if mineral slurry should be added back to the Special Provisions.

7. Shaft Tip Rock Backfilling when Shaft is Overexcavated

This was continuing discussion from the October meeting. The ADSC Members agreed that backfilling with rock would be useful in certain situations. There was discussion of how to incorporate this into the Contract. By the current Special Provisions, this wouldn't be allowed. It was agreed that rock backfilling could be addressed in the drilled shaft submittal as part of Item 8.

Action Plan:

- No action needed.

8. Achieving Rebar Cage Plan Elevation with Full Depth Casing

This was also continuing discussion from the last meeting. The preferred approach is to support the rebar cage from a crane or other means at the surface. However, when full-depth casing is used, this may not be possible. As described above, it was agreed that rock backfill could be used to help maintain cage tip elevation. If the Contractor plans on using this method, it will be described in Item 8 of the drilled shaft submittal.

Action Plan:

- Mike will add some language in item 8 of the shaft installation submittal requiring specific description of how the cage will be supported.

9. Presentation on Single Bore Multiple Anchors

Alan Macnab made a presentation on the use and application of single bore multiple anchors. This system uses a single bore hole with individual anchors of varying length. The varying length of the anchors provides an improved distribution of the anchor loads in the soil. For a given anchor load, this would allow the overall anchor length and bore length to be reduced. This system is especially cost effective in soft, poor quality soils.

The ADSC Members were familiar with this system. They pointed out that this was a proprietary system and is only available through a single supplier. This makes it unlikely that the State would specify the use of single bore multiple anchors in a contract. WSDOT would entertain a Contractor proposal to use this system if there were a benefit to the State.

There was also some discussion on testing of these anchors. Since each of the strands is individually loaded, testing would become more complicated. The general consensus was that testing concerns could be addressed if these anchors are ever used on a State contract.

Action Plan:

- The State will be receptive to a CRIP if such proprietary system is proposed by the Contractor. No further action needed.

10. Joint Training Workshop Preparation

Joint training will be provided in Bothell on March 23rd. The Team agreed to a January 10th meeting at DBM's office to plan for this training. Meeting attendees will include Alan, Tom, Mark E., Jeff, Jim, Mo, and either Geoff or Patrick.

Action Plan:

- Alan/Mo provide update at next meeting.

11. End of Year Shaft Construction Report

Mo recapped the year in drilled shaft construction. Overall, we have had a very successful year. On State projects, 103 drilled shafts (4' to 10' diameter) were constructed in the past year. CSL tests and further field explorations identified 15 shafts that had defects, with four shafts requiring repair. In all four cases, the repairs were related to lack of side cover.

Force account amounts in the contract are typically 15% of the total estimated drilled shaft cost. Actual average force account work was 25% of the contract amounts.

Both Alan and Don expressed interest about having Mo write a letter describing the successes of the ADSC/WSDOT Joint Task Force. Don suggested that this letter could be written to the ADSC magazine. The hope is that our successful experience will encourage other States to initiate similar programs.

Action Plan:

- Mo/Alan to discuss ADSC letter further.

12. Additional Miscellaneous Items

Mo asked the Team for some feedback on the constructability reviews. He asked if we should consider having a smaller panel review these projects rather than reviewing them in the regular meetings. The general consensus was that we should continue the current practice. If there were several projects up for review at the same time, the smaller group may be beneficial.

Alan asked that the actual decision makers are available for the constructability reviews. Otherwise, he was concerned that the suggestions from the Team wouldn't be incorporated. Mo acknowledged that it would be beneficial to have the decision makers involved, but he pointed out that the written comments from the ADSC Members are provided to the decision makers.

Mo also listed some items to work on in the coming year. Mo hopes to finish updating the force account payments and establish prequalification for Contractors on noise wall/sign bridge shafts. Mo also hopes to make progress on shaft tip grouting.

Action Plan:

- No action needed.

13. Future Meeting Date

The Team discussed and agreed to the following future meeting dates.

- January 17th.
- March 20th.
- May 4th.
- June 22nd.
- August 10th.